

# IVX

# 1000



13th/12th Gen Intel® Core™ i9/i7/i5/i3 Processor (Raptor Lake/Alder Lake)  
In-Vehicle Computing Workstation



### ^ Advanced Driver Assistance System (ADAS)



- Workstation-grade Platform : 13th/12th Gen Intel® Core™ i9/i7/i5/i3 Processor ( Raptor Lake-S/Alder Lake-S) running with Intel® R680E PCH supports max 65W TDP CPU
- Optional supports outstanding AI computing productivity by advanced and compact NVIDIA® Quadro® MXM graphics
- 16V to 160V DC Power Input with 4kV DC Isolation, up to 500V Surge Protection, Software Ignition Power Control, optional UPS supported
- Fanless design for railway in-vehicle applications, fully compliant with EN50155 : 2017
- 8 Independent 2.5GigE LAN M12 X-coded
- Up to 6 front-access 7mm to 15mm height SSD/HDD Tray
- Supports Intel® vPro, TCC, Time-Sensitive Networking (TSN), and TPM 2.0

### ∨ Public Security



### ^ Mobile Communication

intel partner  
Gold IoT Solutions



# Vecow

# Specifications

## System

|           |                                                                                                                                               |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Processor | - 24-core 13th Gen Intel® Core™ i9/i7/i5/i3 Processor (Raptor Lake-S)<br>- 16-core 12th Gen Intel® Core™ i9/i7/i5/i3 Processor (Alder Lake-S) |
| Chipset   | Intel® R680E Chipset                                                                                                                          |
| BIOS      | AMI                                                                                                                                           |
| SIO       | IT8786E                                                                                                                                       |
| Memory    | 2 DDR5 4800MHz SO-DIMM, up to 64GB                                                                                                            |
| OS        | Windows 10, Linux                                                                                                                             |

## I/O Interface

|              |                                                                |
|--------------|----------------------------------------------------------------|
| Serial       | 4 Isolated COM RS-232/422/485                                  |
| USB          | - 4 USB 3.2 Gen2<br>- 1 A-coded M12 USB 2.0 with 2-port signal |
| Isolated DIO | 16 Isolated DIO : 8 DI, 8 DO                                   |
| LED          | Power, HDD, PoE, Wireless                                      |
| SIM Card     | 2 External SIM Card Sockets                                    |
| RTC Battery  | Front-access RTC Battery                                       |

## Expansion

|           |                                                                                                      |
|-----------|------------------------------------------------------------------------------------------------------|
| Mini PCIe | 1 Mini PCIe sockets for PCIe/USB/SIM Card/Optional mSATA                                             |
| M.2       | - 1 M.2 Key B Socket (3052/2280, PCIe/USB 3, default/USB 2)<br>- 1 M.2 Key E Socket (2230, PCIe/USB) |
| SUMIT     | 2 SUMIT Slot (Optional)                                                                              |

## Graphics

|                    |                                                                                                                                         |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Graphics Processor | - Intel® UHD Graphics 770 driven by Intel® X® Architecture<br>- Independent MXM Graphics : By request                                   |
| Interface          | - 1 VGA : Up to 1920 x 1200 @60Hz<br>- 2 HDMI : Up to 1920 x 1080 @60Hz<br>- 2 DisplayPort : Up to 4096 x 2304 @60Hz (By requested MXM) |

## Storage

|                |                                                                                                                                               |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| SATA           | <b>IVX-1000</b> : 2 SATA III (6Gbps) support software RAID 0, 1<br><b>IVX-1000 ICY</b> : 6 SATA III (6Gbps) support software RAID 0, 1, 5, 10 |
| mSATA          | 1 SATA III (Mini PCIe Type, 6Gbps)                                                                                                            |
| M.2            | 1 M.2 Key M Socket (2280, PCIe x4)                                                                                                            |
| Storage Device | <b>IVX-1000</b> : 2 Front-access 2.5"SSD/HDD Tray<br><b>IVX-1000 ICY</b> : 6 Front-access 2.5"SSD/HDD Tray (15mm in height)                   |

## Audio

|                 |                                           |
|-----------------|-------------------------------------------|
| Audio Codec     | Realtek® ALC888S-VD, 7.1 Channel HD Audio |
| Audio Interface | 1 Mic-in, 1 Line-out                      |

## Ethernet

|                 |                                                                             |
|-----------------|-----------------------------------------------------------------------------|
| LAN 1           | Intel® I219LM GigE LAN supports iAMT                                        |
| LAN 2           | Intel® I226 2.5GigE LAN supports TSN                                        |
| LAN 3 to LAN 6  | Intel® I226 2.5GigE LAN, X-Coded M12 Connector                              |
| LAN 7 to LAN 10 | 2.5GigE IEEE 802.3at (25.5W/48V) PoE+ by Intel® I226, X-Coded M12 Connector |

## Power

|                    |                                                                                             |
|--------------------|---------------------------------------------------------------------------------------------|
| Power Input        | DC 16V to 160V, Max. support 200W                                                           |
| Power Interface    | 3-pin Terminal Block : V+, V-, Frame Ground                                                 |
| Ignition Control   | 16-mode Software Ignition Control                                                           |
| Remote Switch      | 3-pin Terminal Block                                                                        |
| Isolation          | 4kV DC                                                                                      |
| Surge Protection   | 0.5kV DC 8/20us Surge                                                                       |
| UPS (IVX-1000 ICY) | - Optional supports 3 stackable 18650 Li Batteries (2.5Ah)<br>- Optional supports Super Cap |

## Others

|                |                                                                               |
|----------------|-------------------------------------------------------------------------------|
| TPM            | Infineon SLB9670 supports TPM 2.0, SPI Interface                              |
| Watchdog Timer | Reset : 1 to 255 sec./min. per step                                           |
| Smart Mgmt.    | Wake on LAN, PXE supported                                                    |
| HW Monitor     | Monitoring temperature, voltages. Auto throttling control when CPU overheats. |

## Environment

|                       |                                                                                                                                                                                                                                                                                    |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating Temperature | <b>35W TDP CPU without GPU</b> : -25°C to 75°C (-13°F to 167°F)<br><b>35W TDP CPU with &lt;50W GPU</b> : -25°C to 55°C (-13°F to 131°F)<br><b>65W TDP CPU without GPU</b> : -25°C to 65°C (-13°F to 149°F)<br><b>65W TDP CPU with &lt;50W GPU</b> : -25°C to 45°C (-13°F to 113°F) |
| Storage Temperature   | -40°C to 85°C (-40°F to 185°F)                                                                                                                                                                                                                                                     |
| Humidity              | 5% to 95% Humidity, non-condensing                                                                                                                                                                                                                                                 |
| Relative Humidity     | 95% @55°C                                                                                                                                                                                                                                                                          |
| Shock/Vibration       | - IEC 61373 : 2010<br>- Railway Applications : Rolling Stock Equipment, Shock and Vibration Test                                                                                                                                                                                   |
| EMC                   | CE, FCC, EN50155, EN50121-3-2                                                                                                                                                                                                                                                      |

## Mechanical

|            |                                                                                                                                   |
|------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Dimensions | <b>IVX-1000</b> : 360mm x 228mm x 88mm (14.2" x 8.9" x 3.5")<br><b>IVX-1000 ICY</b> : 360mm x 228mm x 171mm (14.2" x 8.9" x 6.7") |
| Weight     | <b>IVX-1000</b> : 7.1 kg (15.65 lb)<br><b>IVX-1000 ICY</b> : 10.6 kg (23.43 lb)                                                   |
| Mounting   | - Wallmount by mounting bracket<br>- Rackmount (Optional)                                                                         |

## Ordering Information

| Model No.    | GigE LAN | 2.5G LAN | 2.5G PoE+ | Isolated COM | Isolated DIO | SSD Tray | UPS |
|--------------|----------|----------|-----------|--------------|--------------|----------|-----|
| IVX-1000     | 1        | 1 RJ45   | 4 M12     | 4            | 16           | 2        | NA  |
| IVX-1000 ICY |          | 8 M12    |           |              |              | 6        | Yes |

## CPU List

| Series       | CPU        | Cores | GHz | TDP (W) | CPU        | Cores | GHz | TDP (W) | ECC |
|--------------|------------|-------|-----|---------|------------|-------|-----|---------|-----|
| Intel® Core™ | i9-13900E  | 24    | 5.2 | 65      | i9-12900E  | 16    | 5   | 65      | Y   |
|              | i9-13900TE | 24    | 5   | 35      | i9-12900TE | 16    | 4.8 | 35      |     |
|              | i7-13700E  | 16    | 5.1 | 65      | i7-12700E  | 12    | 4.8 | 65      |     |
|              | i7-13700TE | 16    | 4.8 | 35      | i7-12700TE | 12    | 4.7 | 35      |     |
|              | i5-13500E  | 14    | 4.6 | 65      | i5-12500E  | 6     | 4.5 | 65      |     |
|              | i5-13500TE | 14    | 4.5 | 35      | i5-12500TE | 6     | 4.3 | 35      |     |
|              | i3-13100E  | 4     | 4.4 | 65      | i3-12100E  | 4     | 4.2 | 65      |     |
|              | i3-13100TE | 4     | 4.1 | 35      | i3-12100TE | 4     | 4   | 35      |     |

## Optional Software

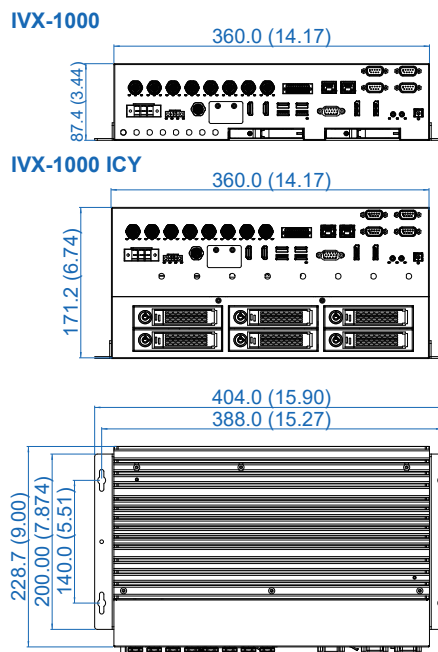
|                   |                      |
|-------------------|----------------------|
| VHub AI Developer | AI Developer Kit     |
| VHub ROS          | AMR Developer Kit    |
| VHub EtherCAT     | I/O Control Platform |

## Accessories

|                    |                                                                                     |
|--------------------|-------------------------------------------------------------------------------------|
| DDR5 32G           | Certified DDR5 32GB 4800MHz RAM                                                     |
| DDR5 16G           | Certified DDR5 16GB 4800MHz RAM                                                     |
| DDR5 8G            | Certified DDR5 8GB 4800MHz RAM                                                      |
| PWA-180WB          | 180W, 24V, 90V AC to 264V AC Power Adapter with 3-pin Terminal Block (7.62mm pitch) |
| PWA-330WB          | 330W, 24V, 90V AC to 264V AC Power Adapter with 3-pin Terminal Block (7.62mm pitch) |
| TMK2-20P-100       | Terminal Block 20-pin to Terminal Block 20-pin Cable, 100cm                         |
| TMK2-20P-500       | Terminal Block 20-pin to Terminal Block 20-pin Cable, 500cm                         |
| TMB-TMBK-20P       | Terminal Board with One 20-pin Terminal Block Connector and DIN-Rail Mounting       |
| Rackmount          | 2U/4U Rackmount Kit                                                                 |
| M.2 Storage Module | M.2 Key M Storage Module                                                            |
| 5G Module          | 5G Module with Antenna                                                              |
| 4G Module          | 4G/GPS Module with Antenna                                                          |
| WiFi & Bluetooth   | WiFi & Bluetooth Module with Antenna                                                |

## Dimensions & Drawing

Unit : mm (inch)



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